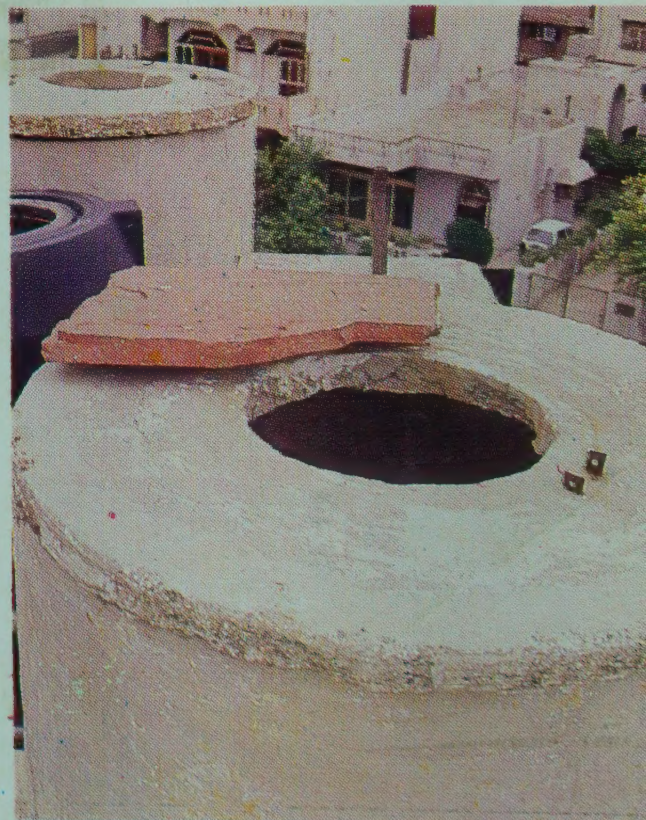


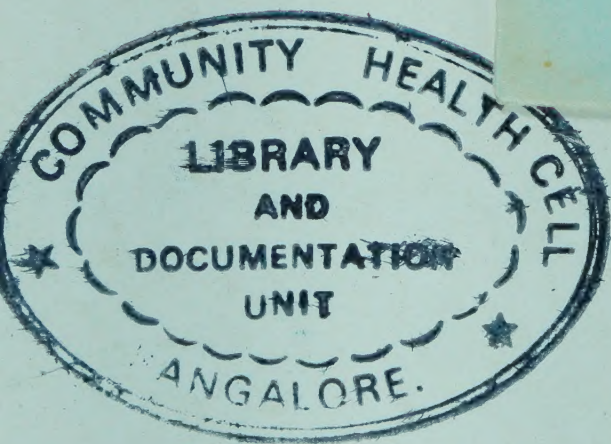
SEVEN POINT ACTION PLAN FOR MALARIA CONTROL IN URBAN AREAS



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URBAN MALARIA CONTROL

(Example Madras)

7-POINT ACTION PLAN FOR MALARIA CONTROL

Madras city is endemic for malaria and cases of drug resistant *Plasmodium falciparum* malaria have been recorded. Focal malaria outbreaks are often encountered and the problem of urban malaria in Tamil Nadu is of long standing. It may be pointed out that Madras city alone contributes 50-70% new malaria cases annually to the malaria problem of the state (Fig. 1). The vector *Anopheles stephensi* responsible for malaria transmis-

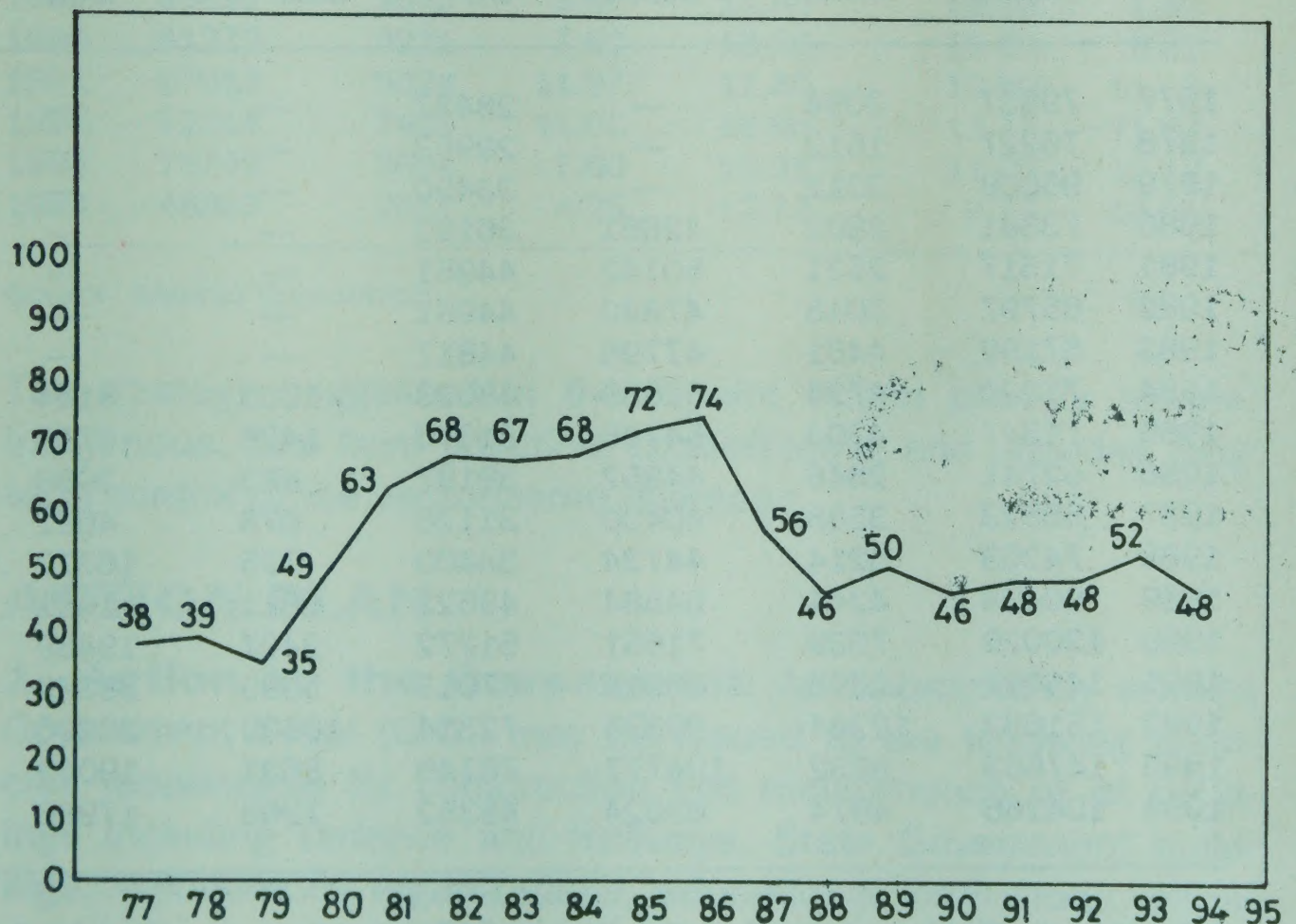


Fig. 1: Percentage of malaria cases indigenous to Madras city in the state of Tamil Nadu

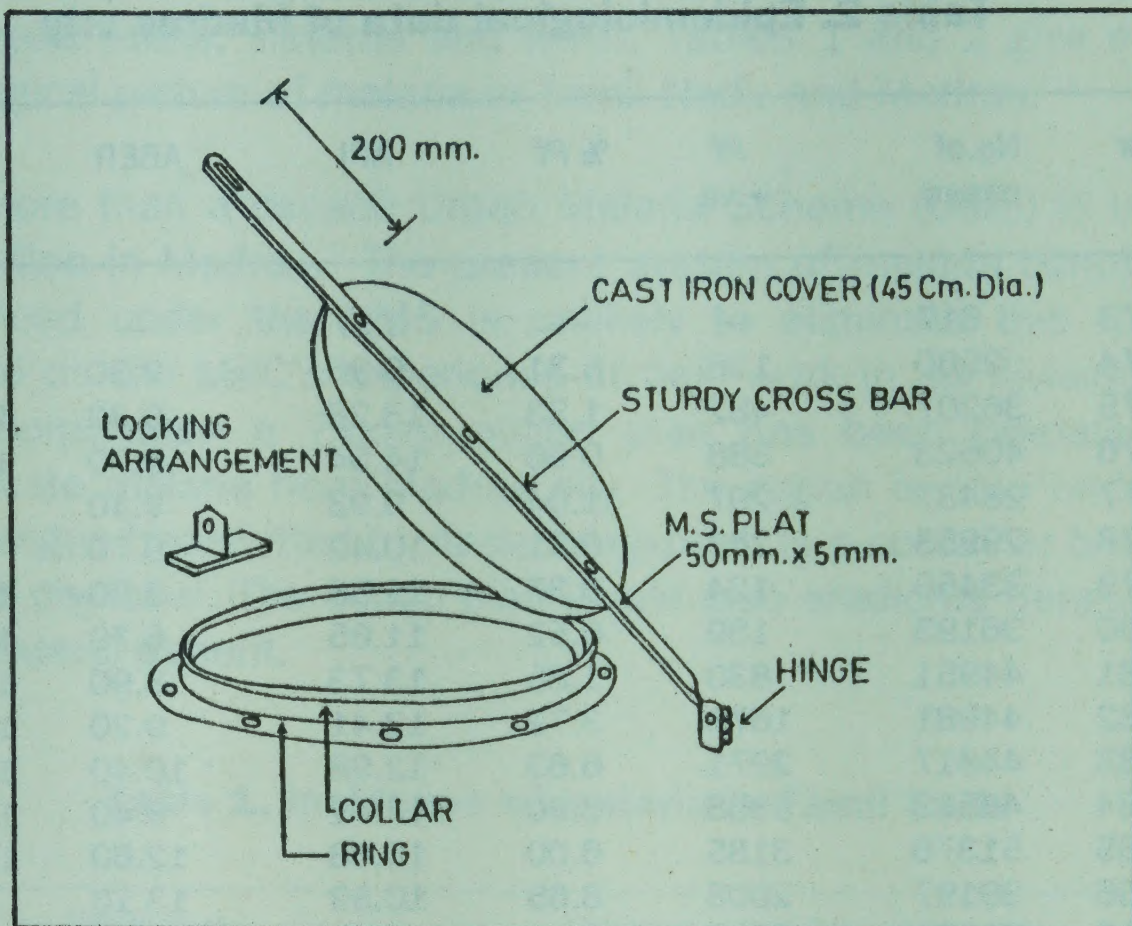


Fig. 2: Standard design of a cover to be used for mosquito proofing of OHT, well or cistern

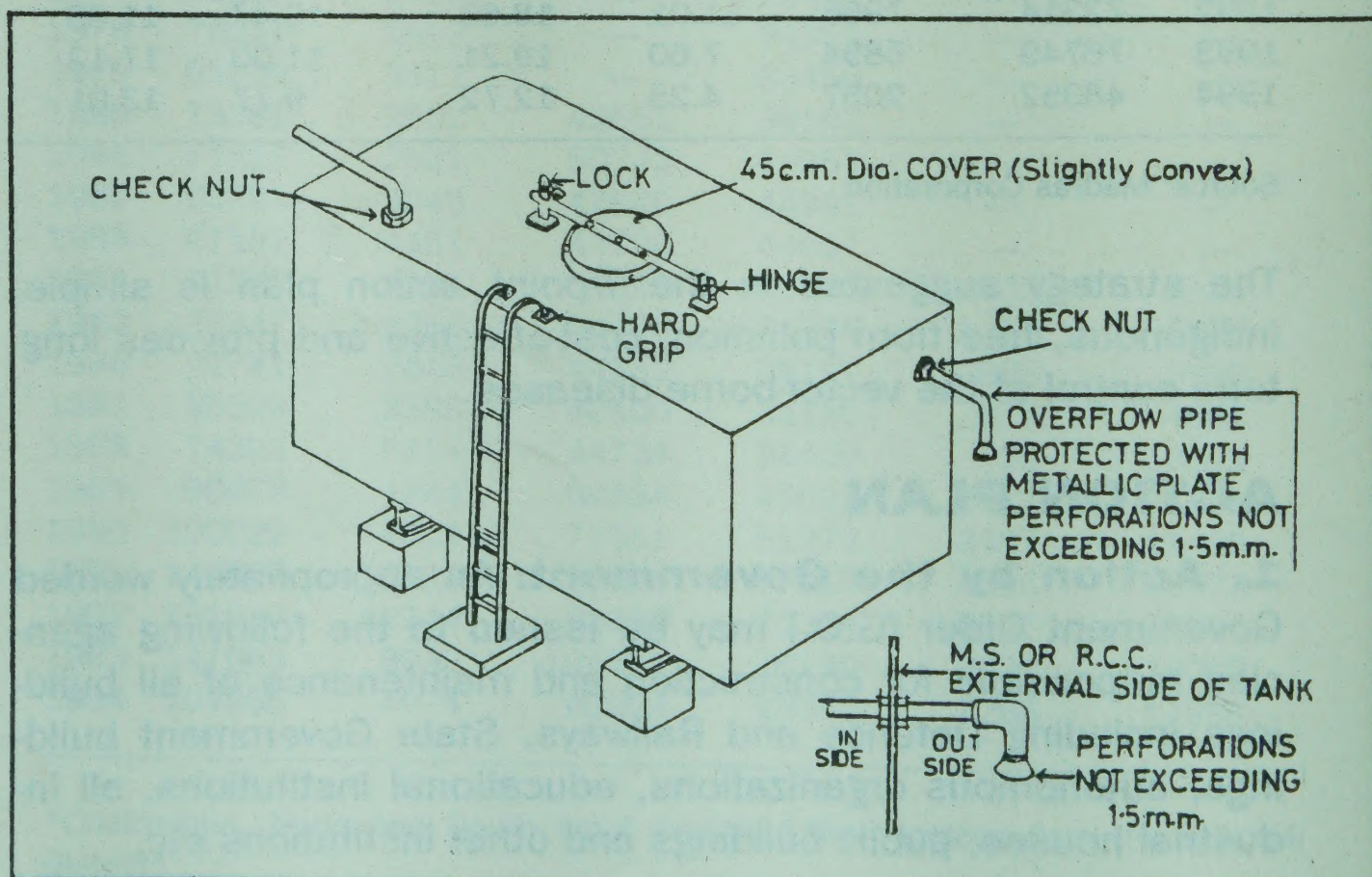


Fig. 3: Standard design of over head tank

Mosquito-proof all water storage overhead tanks (OHTs), cisterns and wells. Water should not be allowed to leak from pipe lines, taps etc. and proper drainage must be maintained. Water coolers and air conditioners etc. should be cleaned atleast once a week to eliminate standing water.

No further installation of OHTs/cisterns and wells should be permitted unless they are mosquito-proofed (Figs. 2-4).

One officer in each building/institution should be designated for vector control work and given full responsibility to ensure that there is no mosquito breeding in his building. His name should be communicated to the Corporation as a contact person for interaction and inspection. He should be allowed adequate budget for vector control work and made fully accountable. Expenditure towards this activity should preferably be met from the budget of the respective organisation/institution.

The Government should also ensure the following :

- (i) Technology for mosquito proofing of the wells, OHTs/cisterns should be made available easily through various media. It would also be advisable to ensure the availability of readymade mosquito-proof OHTs/cisterns etc. in the open market for installation.
- (ii) Provision of loans (preferably interest free) should be made through banks or Corporation to avoid hardships in the mosquito-proofing of water storage facilities. Recovery of loans should be made in easy installments.
- (iii) A source for the supply of larvivorous fish and expanded polystyrene (EPS) beads should be identified and given due publicity.
- (iv) Larvicidal oil should be available in the open market in tins for use by the contractors (at present it is a government supply). The label on the tin should provide full instructions on its method of application.

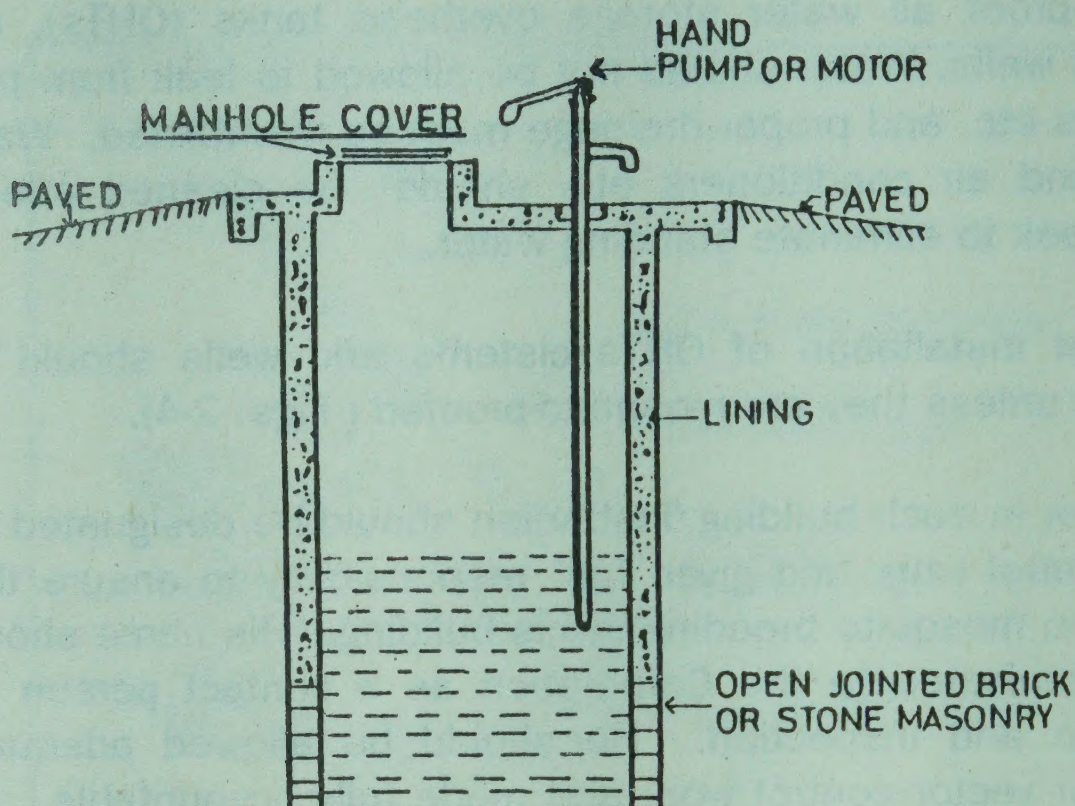


Fig. 4: Standard method of mosquito proofing a well

A similar action of mosquito-proofing of OHTs/cisterns and wells should be adopted in all colonies/divisions of the Madras city. In order to implement the strategy Health Department/Corporation should elicit people's participation, involve health education bureau, prepare educational material and make full use of media. The Health Department should also involve voluntary agencies, non-governmental organizations (NGOs), students, *Mahila mandals* and other action groups in whatever manner possible in dissemination of activities of the action plan for mosquito control and solicit positive support through individuals and joint action (e.g., *shramdan*) for the preventive and corrective aspects of mosquito breeding.

It may be noted that main mosquito breeding sites of malaria vector *An. stephensi* are OHTs and wells followed by cisterns. Mostly *Ae. aegypti* (a day biter mosquito) breeds in cisterns, and is responsible for dengue outbreaks and during 1989 there were cases of dengue haemorrhagic fever in Madras.

A major activity of Health Department should be to identify all mosquito breeding sites (geographical reconnaissance) and prepare action plan for the control of mosquito breeding for each habitat. In this activity Health Department would be required to solicit help from other departments/agencies. Follow-up action,

persuasion, providing technical guidance and monitoring would be an important function of the Health Department which must be planned and executed meticulously.

Early case detection through passive agencies, activated mass blood surveys, rapid blood smear examination and administration of presumptive and radical treatment must be ensured. In certain high transmission areas malaria clinics may be opened and given full publicity.

2. Inter- and Intra-Departmental Coordination: Health department of corporation/municipalities in consultation with the state health department should be responsible for coordination of vector control work in the city. In that capacity they would be required to solicit from their own and other departments/agencies their active participation in preventive and corrective aspects of mosquito control. Some government departments must participate in malaria control programme directly. For example water supply department must ensure that water pipes/lines are well protected and not damaged and there are no leaking water taps or pipelines. All leakages/damages should be repaired on priority basis within 24-48 hours and stagnant water drained. Sewage and storm water pipes should be well maintained and cleaned as and when due. All manhole covers should be repaired and properly installed to prevent mosquito emergence. Similarly, ventilating shafts should be mosquito-proofed. Horticulture department must ensure that no mosquito breeding occurs in stagnant water in gardens, parks, and ornamental fountains etc. The fisheries department must ensure clear shore line of the ponds and other water bodies and survival of larvivorous fishes in all water bodies. All government engineering departments must ensure prevention of water stagnation, adequate drainage and if stagnant water is required for some activity it should be suitably treated to prevent mosquito breeding.

Health department should elicit people's participation and involvement in mosquito control through educational programmes and they should make full use of media in achieving this. School/ College students and voluntary agencies should be mobilised in preventing mosquito breeding.

It may be pointed out that in certain parts of Madras city there is acute shortage of water and people belonging to low socio-economic status are the worst hit. In such localities water lines are damaged or public water facilities are misused. Government must ensure proper water supply in such areas before initiating action to repair the damage or stopping water supply to such localities.

3. Legislative Measures: Municipal bye-laws must be implemented rigidly and defaulters should be punished. Bye-laws in Madras have been amended recently for this purpose. For the effective enforcement of provisions under the Public Health Act and Madras City Municipal Corporation Act, the Assistant Entomologists may be empowered to issue notices and institute prosecution proceedings with the prior approval of the concerned Senior Entomologist. The fine to be imposed to the defaulters should double up every time with non-compliance. The Government of Tamil Nadu may be requested to bring suitable amendment to the Act.

4. Clearance from Health Department: New constructions should be permitted only after obtaining permission/clearance from the health department/corporation of Madras and it should be made compulsory for the owners to deposit the expenditure to be incurred for undertaking anti-mosquito measures in their premises. The Health Department/Corporation of Madras should decide on the amount to be deposited, for undertaking preventive/remedial measures, depending upon the potential breeding sources and duration of water storage. No building plan should be cleared if it does not fulfill the conditions specified in the Public Health Act. In the ongoing constructions mosquito proofing of OHTs, cisterns and wells must be ensured, and help of bye-laws should be taken for compliance. It may be pointed out that this procedure is currently followed by the Bombay Municipal Corporation and there are no protests or complaints in the implementation of this system.

5. Tropical Aggregation of Labour: A large number of agencies are constantly engaged in construction work all over the township. It has been observed that tropical aggregation of labour for construction is often the primary cause of the estab-

ishment of foci resulting in outbreaks of malaria. It is therefore, absolutely essential that (i) incoming labour is screened for malaria infection and given radical treatment, and (ii) all construction sites are made free of mosquito breeding. In order to achieve this objective construction companies/contractors must take help of health department and ensure that water is not allowed to stagnate. All standing water whether for curing or construction work must be treated with chemical larvicides like Baytex or Abate or MLO. In certain situations like big water reservoirs *Gambusia* (*Gambusia affinis*) fishes should be introduced. In polluted waters Guppy (*Poecilia reticulata*) fishes may be introduced. There should be regular inspection of all sites and preventive measures of mosquito breeding applied rigidly as soon as any standing water is found.

It would be advisable to include the preventive aspects of mosquito control in the contract itself. Government may therefore issue appropriate instructions to all departments for such action. Failure to maintain the site free of mosquito breeding should attract prompt action under the bye-laws. It is noteworthy to mention that this is a fairly easy and inexpensive method of malaria prevention, and if implemented properly it works wonderfully.

In areas of large populations of migrant labour one time screening of labour and radical treatment of those found with malaria parasite may be undertaken by the health department.

6. Implementation Mechanism: The work should be started in phases as indicated below :

Phase-I (Six months)

- (i) Map all mosquito breeding sites. This information is already available and may require minor changes/updating.
- (ii) Implementation of bye-laws.
- (iii) Government order should be issued to all Government, and non-government agencies and other organizations as indicated under item 1.

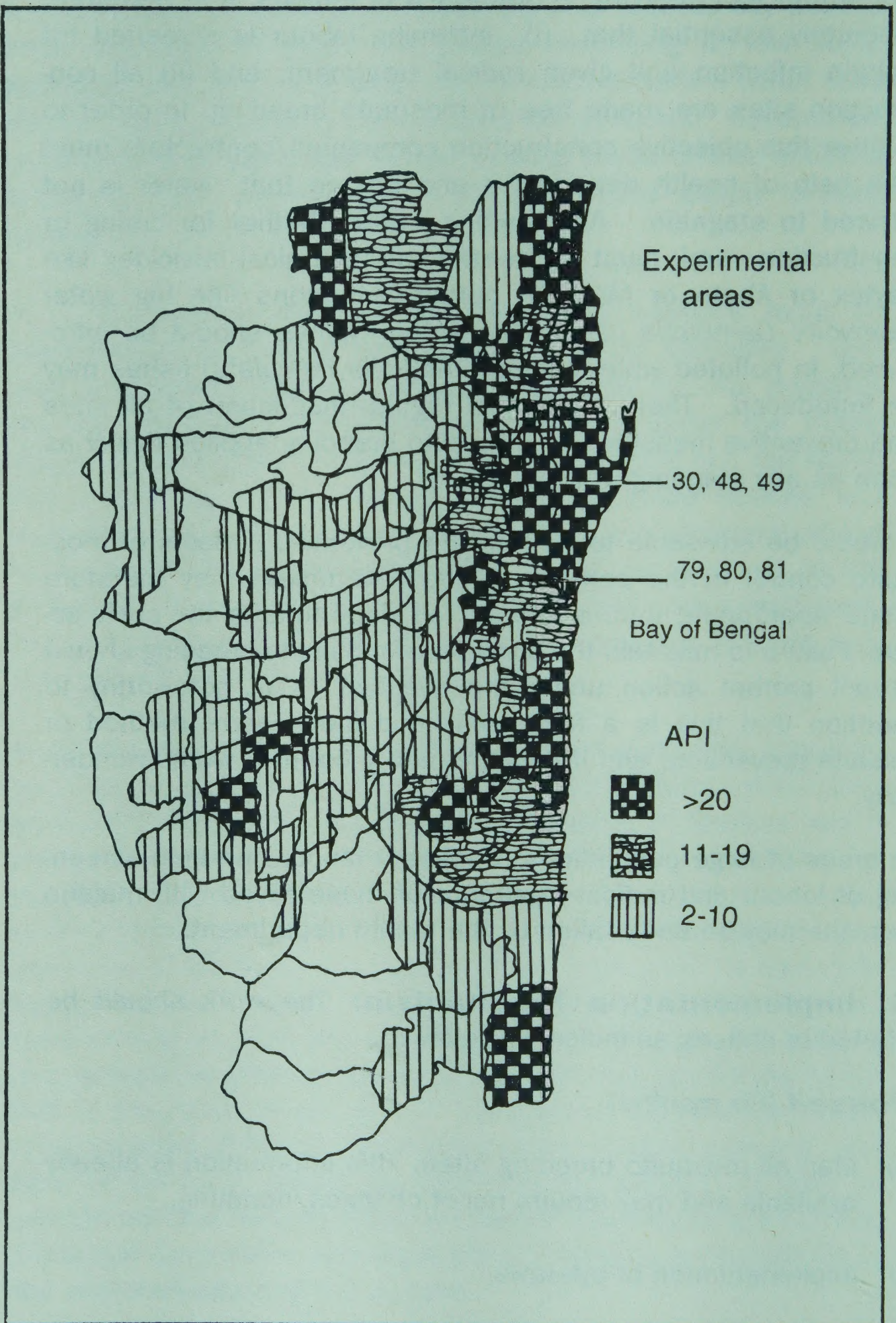


Fig. 5: Madras: The city is divided into 155 divisions. Figure showing the stratification of divisions according to 1993 API. Also shown are 6 divisions under bioenvironmental control strategy implemented by the Malaria Reserach Centre

- (iv) Six divisions at present under the MRC should be taken up (Divisions 30, 48, 49, 79, 80, 81) (Fig. 5).
- (v) Fish multiplication ponds (for *Gambusia* and Guppy) should be established in as many water bodies as possible.
- (vi) Ensure the availability of EPS-beads and availability of mosquito-proofing devices.

Phase-II (Six months)

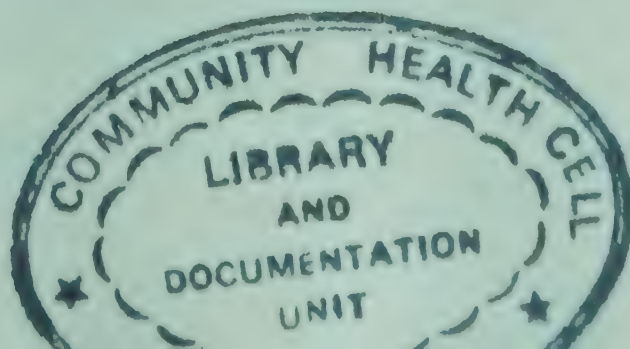
All high incidence divisions (20 API) should be taken up Fig. 5 (i) Stratification of Madras city according to API, and (ii) Areas currently under the bioenvironmental control strategy i.e., divisions 30, 48, 49, 79, 80 and 81.

Phase-III (Six months)

The entire Madras city may be included. (Figs. 6, 7 and 8). Major mosquito breeding sites of *An. stephensi* (vector of malaria), *Ae. aegypti* (vector of dengue) and *Cx. quinquefasciatus* (vector of filariasis and a nuisance mosquito).

Adoption of above methods will result in almost complete interruption of malaria transmission and also cases of dengue fever (Tamil Nadu is endemic for dengue) would come down drastically. Mosquito nuisance will also be curtailed to a very large extent. Control of *Cx. quinquefasciatus*, a nuisance tropical house mosquito and the vector of filariasis (*Wuchereria bancrofti*) would require major environmental modification works which could be taken up at a later stage.

7. Constitution of Committees: The 7-point action plan may be monitored through a steering committee responsible for ensuring continued government and political support and a project committee to oversee the implementation and monitor its progress. The membership to the committees may be finalised by the Government of Tamil Nadu. The following compositions are suggested;



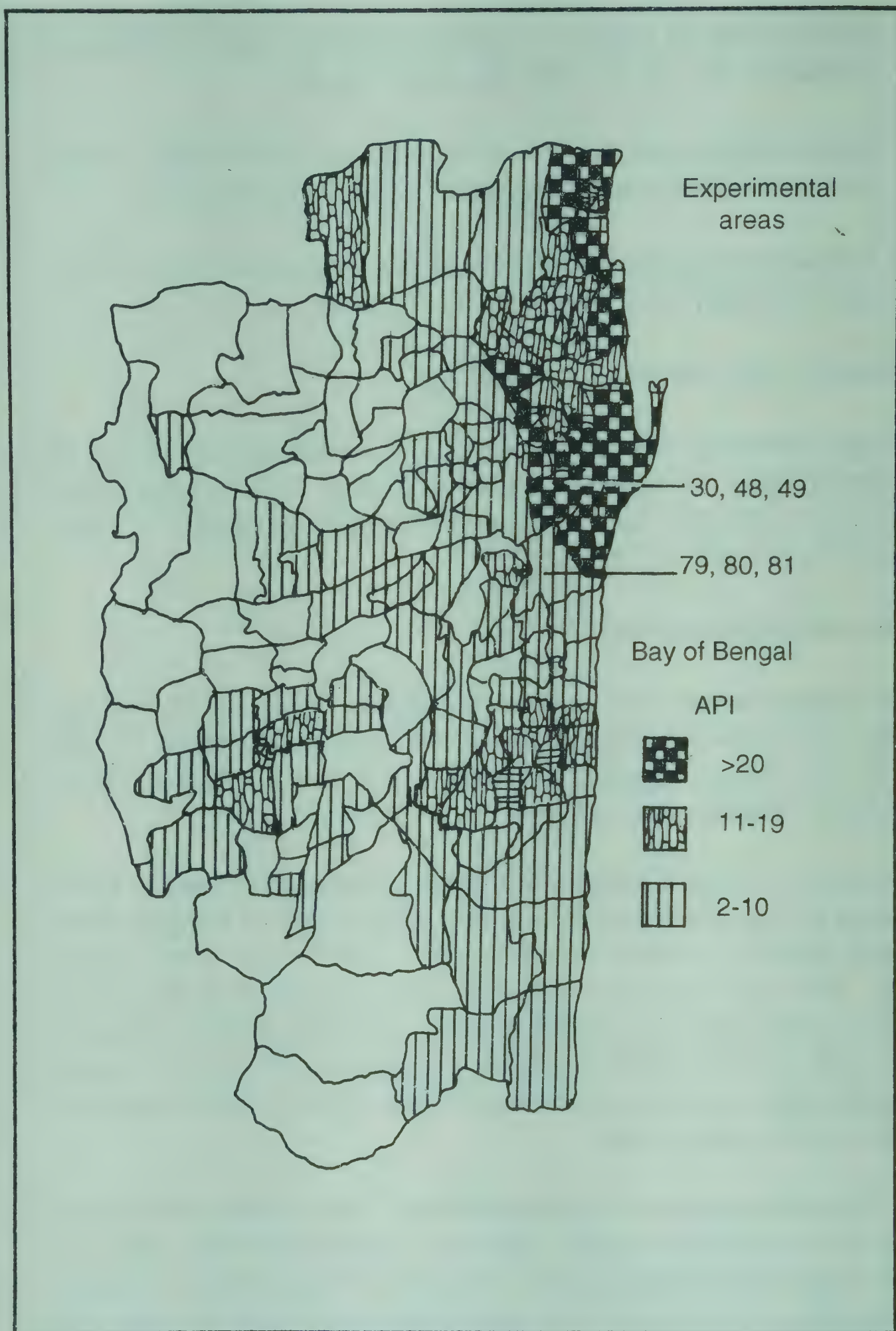


Fig. 6: Madras: The city is divided into 155 divisions. Figure showing the stratification to 1994 API. Also shown are 6 divisions under bioenvironmental control strategy implemented by the Malaria Research Centre

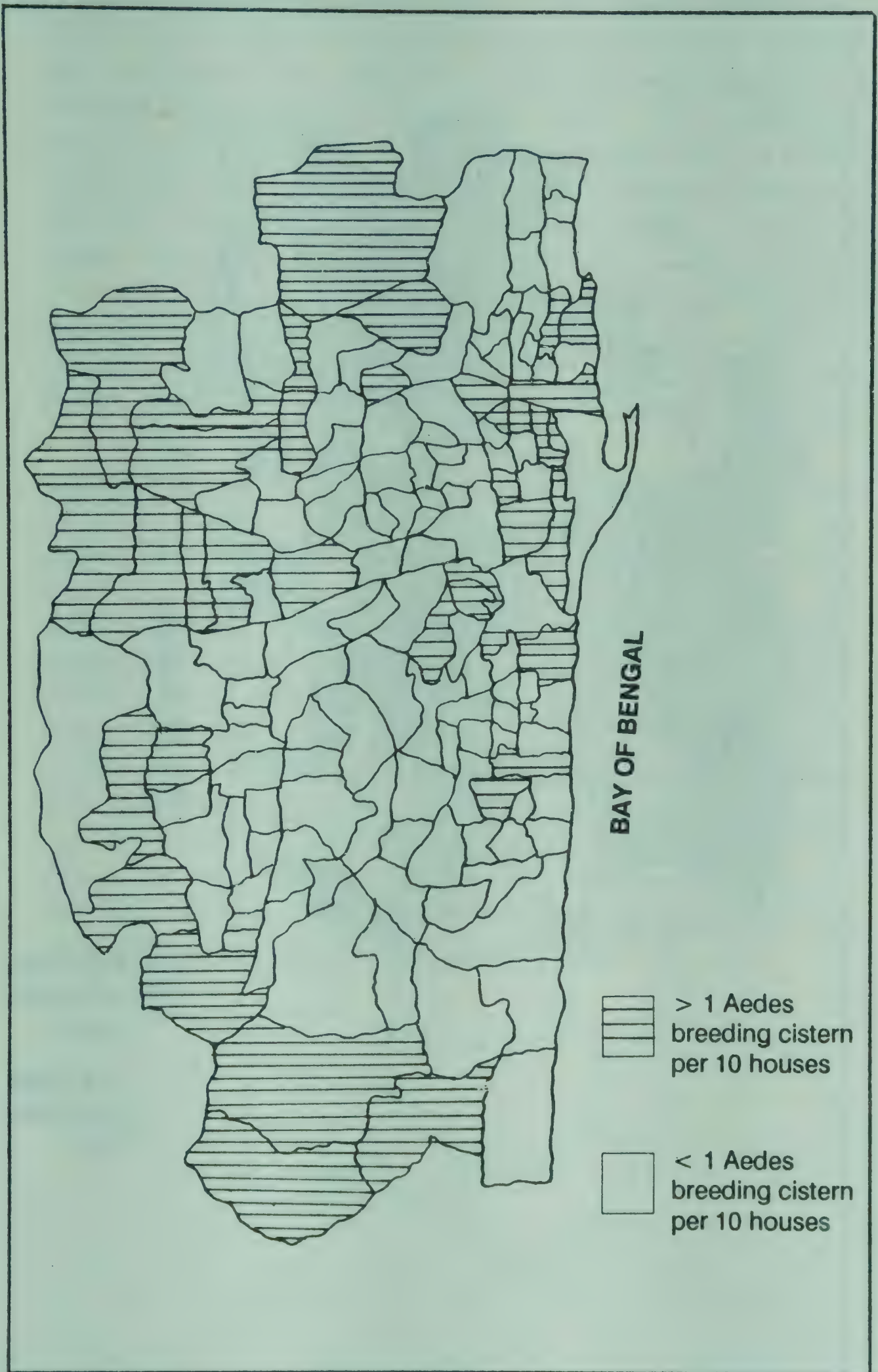


Fig. 7: Madras: *Aedes* breeding potential in the city
(Source: Madras Corporation)

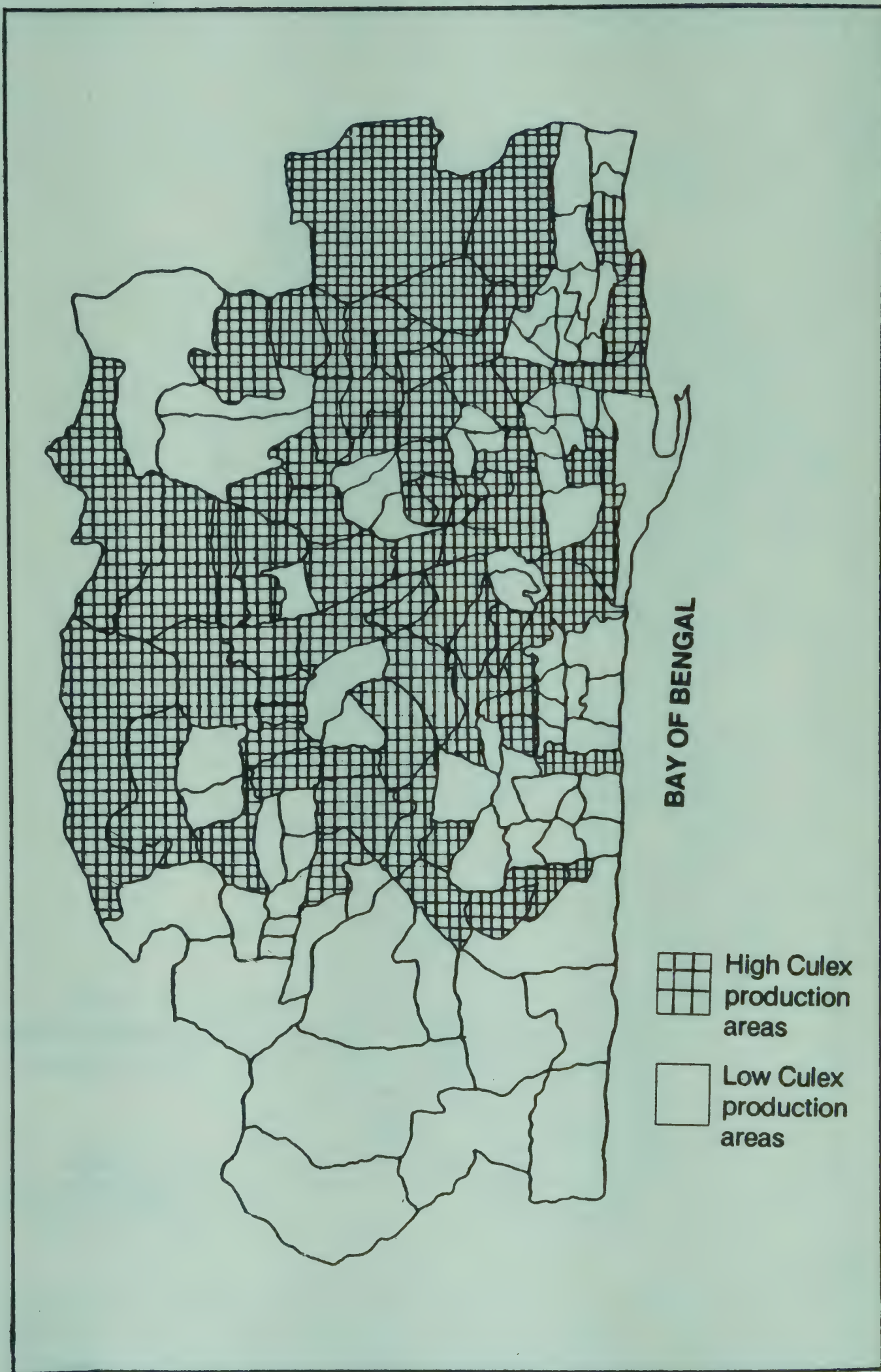


Fig. 8: Madras: *Culex* breeding potential in the city
(Source: Madras Corporation)

- (i) A steering committee which would be an apex body may be constituted to steer the project at the government, political and community level. The committee could be chaired by an eminent scientist of international repute. The committee should have nominees of the Chief Minister, NGO, a social worker, Director MRC, Chairman of the project committee and any other member co-opted by the Chairman. This committee would be responsible for obtaining whole hearted support of the politicians and the government and mobilise community's involvement and participation. The committee will also help in removing bottlenecks and ensure adequate funds. This committee would meet atleast once in six months.
- (ii) A project committee may be constituted with the Chief Secretary as Chairman to evaluate overall performance of the project and to remove bottlenecks. The committee may comprise of the Secretaries of the Department of Health and Family Welfare, Urban Development, Chief Engineer Public Works Department (PWD), Central Public Works Department (CPWD), Local Self Government, the Director, Additional Director (Malaria), Chief Entomologist, Directorate of Public Health and Preventive Medicine, Special Officer, Commissioner (Health) and Health Officer, Madras Corporation, nominee of the Director, MRC, representative of Railways, Defence and two nominated members from social organizations and any other member co-opted by the Chairman. The committee should meet every quarter.

MALARIA RESEARCH CENTRE

OTHER PUBLICATIONS

- (1) *Proceedings of the ICMR/WHO Workshop on Community Participation for Disease Vector Control* (1986) pp. 256
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- (2) *Seroepidemiology of Human Malaria — A multicentric study* (1989), pp. 206
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- (3) *Indigenous Larvivorous Fishes of India* (1991), pp. 66
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- (4) *Proceedings of an Informal Consultative meeting WHO/MRC on Forest Malaria in Southeast Asia* (1991), pp. 206
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- (5) *Malaria Patrika* quaterly (Hindi) 1993 onwards.
- (6) *Community Participation in Malaria Control* (1993), pp. 295
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- (7) *Larvivorous Fishes of Inland Ecosystem: Proceedings of the MRC-CICFRI Workshop* (1994), pp. 224
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MALARIA RESEARCH CENTRE

The Malaria Research Centre (MRC) was established in the year 1977. Its primary task was to find short-term as well as long-term solutions to the problem of malaria through basic, applied and field operational research. The Centre is currently doing work in the areas of vector biology and control, genetics, cellular and molecular biology, parasitology, epidemiology, pharmacology and biochemistry, that is related to malariology and the development of malaria control strategies. A network of field laboratories in endemic areas provides the testing ground for new technologies and innovative approaches, and helps in the transfer of technology through training, field demonstrations and mass awareness programmes involving various media. The Centre also provides young scientists the opportunity to participate in advanced research through a fellowship programme. Close links in the form of scientific collaborations are maintained with WHO, NMEP and also leading national laboratories. Research findings of the Centre are published in reputed journals. Apart from this, the Centre publishes several books, monographs, proceedings including the Indian Journal of Malariology.